PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

Rural Urban Classification Systems And Public Health Assessment: Are we nailing Jello™ to the wall?

Epi Brown Bag – April 18, 2006

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

Session Overview

- Using rural urban comparisons in public health assessment
  - What is rural?
  - Rural urban classification scheme basics
    - County definitions
      - Metropolitan/Micropolitan and other county based systems
    - Sub-county definitions
      - Rural Urban Commuting Areas (RUCAs)
  - Resources
- How have these comparisons been used in Washington State?
- Lessons learned in the past few years
  - Choosing the appropriate classification system to use
  - Design and analytical considerations
  - Are rural urban classification schemes robust enough to use over time
  - Comparing 1990 and 2000 RUCA systems
- Guidelines for using rural urban classification in Public Health Assessment
  - Initiatives to establish refine guidelines
  - Use of rural urban classification schemes in Health of Washington
- Discussion

Washington State Department of Health

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

Why are Rural Classification Systems Important?

- Fruit Salad: Multiple classification systems provide inconsistent results – apples to apples, apples to oranges, apples to rutabagas
- Public Health Assessment – our focus today
  - Concern over health disparities between rural and urban areas
  - Targeting resources and interventions
    - Elder care
  - Understanding issues unique to rural areas
    - Accidental death
  - More appropriate comparisons or standards
    - Public Health Improvement Plan
    - Emergency Management and Trauma
    - Health of Washington State
- Allocating and targeting Federal and State health care expenditures and assistance – lots of $$$$
  - Medicare and Medicaid reimbursement
  - "Rural" targeted grant programs
  - Multiple classification systems used - for details see **Rural Definitions for Reimbursement and Program Eligibility**
    - **http://www.doh.wa.gov/hsqa/ocrh/har/hcresrch.htm**

Washington State Department of Health

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

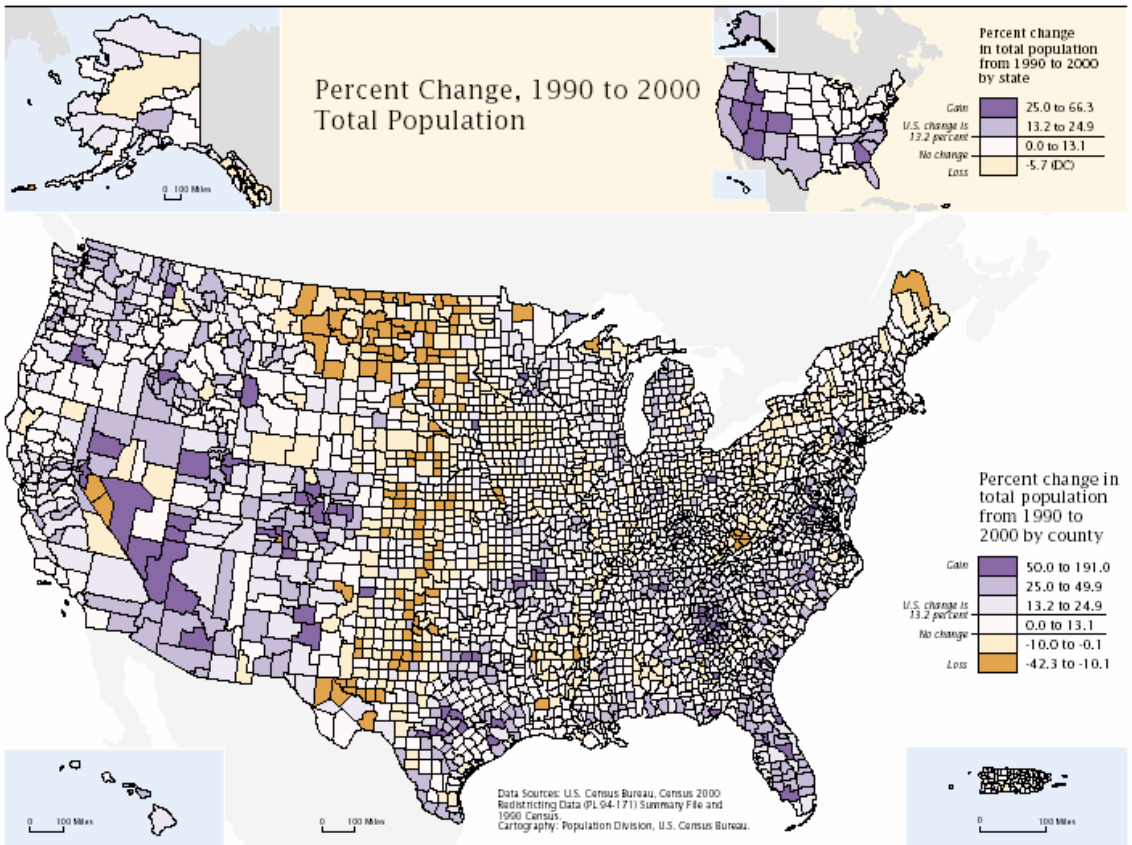
What is rural?
I'll know it when I see it!

Washington State Department of Health

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

Special Issues for Washington State

- Rural population is between 14% and 27% of total state population
  - Relative to neighboring states: small in proportion, large in numbers
  - A significant proportion of Washington's rural population lives in large town areas
  - Most rural areas in Washington are growing (unlike plains states)



Washington State Department of Health

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

Special Issues for Washington

- Large counties include urban and rural areas
  - Snohomish County (Everett and Darrington)
  - Chelan and Douglas counties (East Wenatchee and Grand Coulee)
- Urban counties include urban core and suburban areas
  - King County (Downtown Seattle and Issaquah)
- River and edge settlement patterns (Okanogan County)
- Rural areas not homogenous
  - Large town rural (Moses Lake) vs. isolated rural (Republic)
    - Major differences in access and resources
- Major regional demographic differences
  - Central Washington (Hispanic)
  - Northeast Washington (Tribal)
  - North Puget – Island and San Juan (Caucasian and affluent)
  - College towns (Whitman, Walla Walla, and Kittitas)

Washington State Department of Health

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

County versus Sub-County Definitions

- County-based definitions
  - Most early classification systems used county geography
  - Major issue – under and over bounding “Rural”
  - Examples
    - Metropolitan, Micropolitan, and Outside Core Based Statistical Areas (Federal Office of Management and Budget) – Skamania County classified as Metropolitan
    - Rural or economically distressed counties (33) (State Office of Financial Management) – Yakima classified as rural
    - Urban Influence Codes (US Department of Agriculture)
- Sub-county definitions – most of our work
  - Major issue – complexity and volatility
  - Urban population, Urbanized Areas , Urban Clusters and Non-urbanized areas (Federal Bureau of the Census)
    - Foundation of all rural urban classification systems
  - Rural Urban Commuting Areas (RUCA) (USDA – Federal Office of Rural Health Policy)
    - “State of the Art”

Washington State Department of Health

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

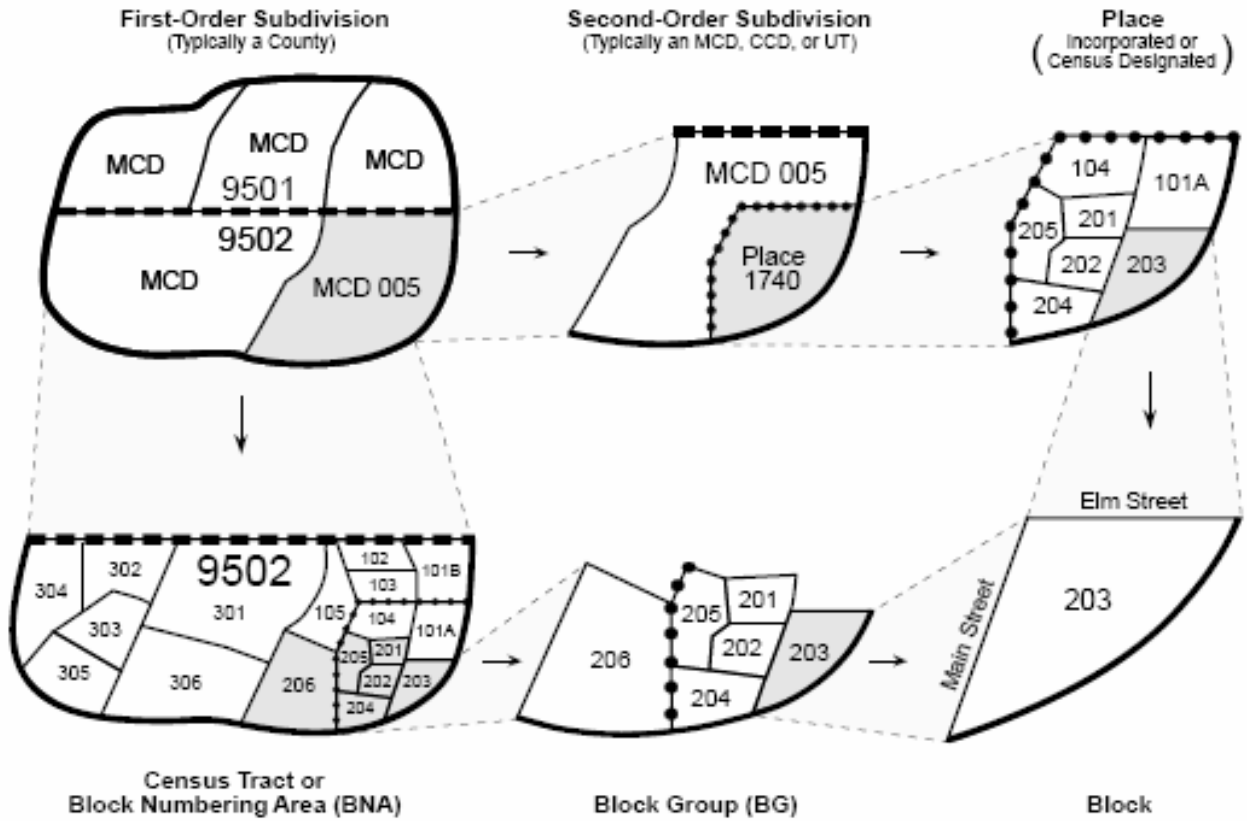
U.S. Census Bureau Definitions of Urbanized Area and Rural Populations

- Urbanized Area definitions drive most rural urban classification systems
  - Definitions developed at Census Block Group Level
- **Urbanized** Areas
  - Continuously built-up areas (density > 1000 person mile^2) of 50,000 or more…
  - Can include adjacent areas with density between 500-1000 persons mile^2
- Urban Clusters (Towns)
  - Built-up areas between 2,500 and 50,000
- **Urban** population – persons living in urbanized areas or urban clusters
  - This is why you will see rural counties with urban populations in census tabulations
- Rural Population
  - Everything Else
- Definitions of urbanized areas revised between 1990 and 2000

Washington State Department of Health

Understanding Census Geography

Figure 2-3. **Small Area Geography in the 1990 Census**

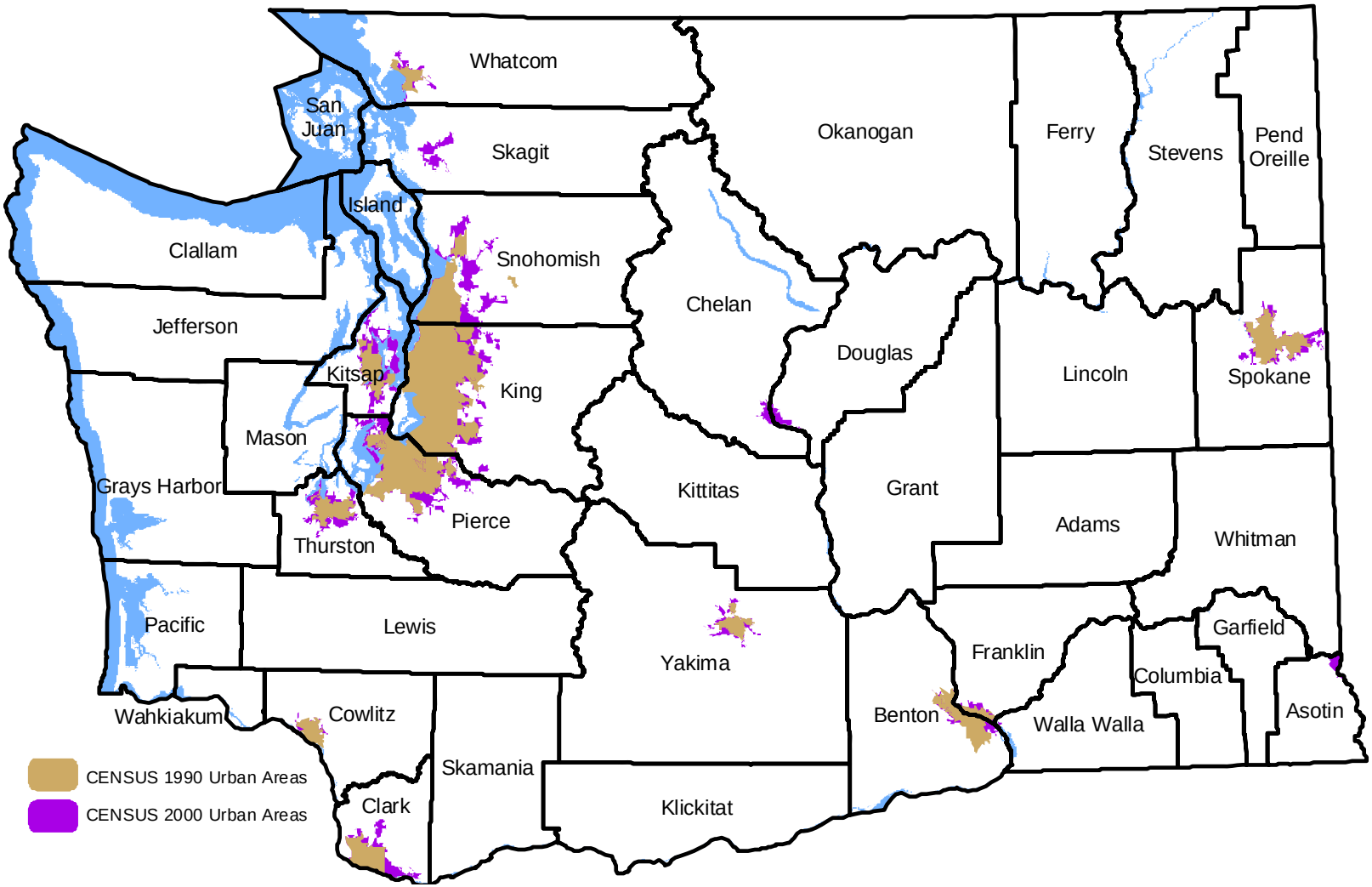


Source: 1990 Geographic Area Reference Manual, US Census Bureau

Washington State Department of Health

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

Urbanized Areas in Washington State 1990 and 2000



Washington State Department of Health

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

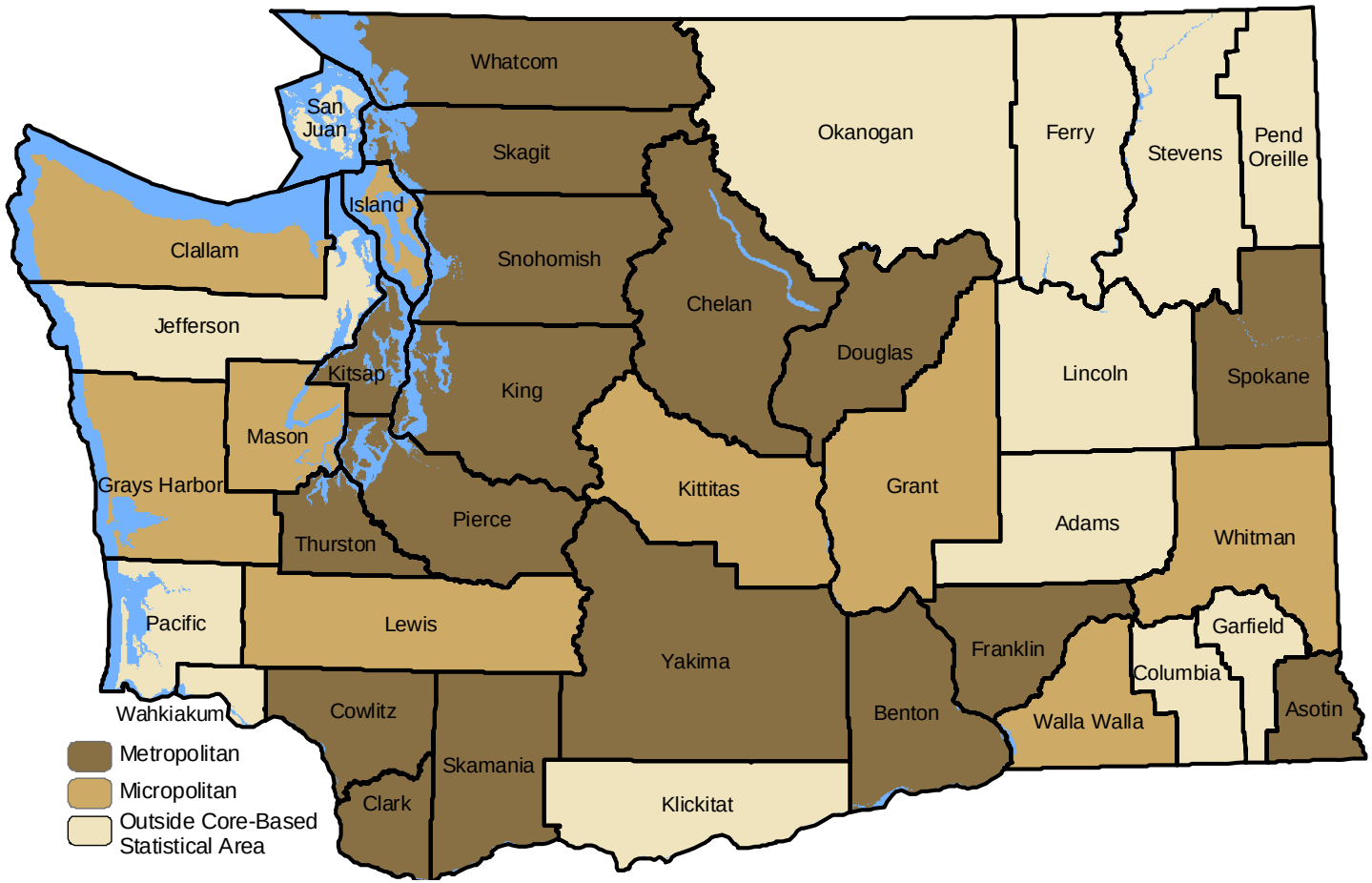
Metropolitan and Micropolitan Counties:

- A Metropolitan county is
  - Any county with an urbanized area of **over 50,000** persons
  - An outlying county where at least 25 % of the residents commute to work between it and another Core-Based Statistical Area (Censusese for a group of associated metropolitan counties (e.g. Multnomah, Oregon and Clark, Washington))
  - Any other county in which at least 50 percent of the population resides in urbanized areas
- A Micropolitan county is
  - Any county with a built up populations of **10,000 to 49,999 persons**
  - Micropolitan counties are not considered Metropolitan
- Outside Core-based Statistical Area -- all other counties
- Formerly Metropolitan and Non-Metropolitan
  - New definitions implemented in 2003 to be updated on a three year cycle
  - Although not technically correct – the term Non-metropolitan county is still used and refers to both Micropolitan and Outside CBSA counties
- Strengths
  - National system/Well-recognized/County Boundaries are Fairly Stable
- Weaknesses
  - Not well suited to Western Geography
  - Criteria for including outlying counties (Skamania County) can lead to counter-intuitive classifications

Washington State Department of Health

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

Metropolitan, Micropolitan, and Outside CBSA (2003) Counties in Washington



Washington State Department of Health

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

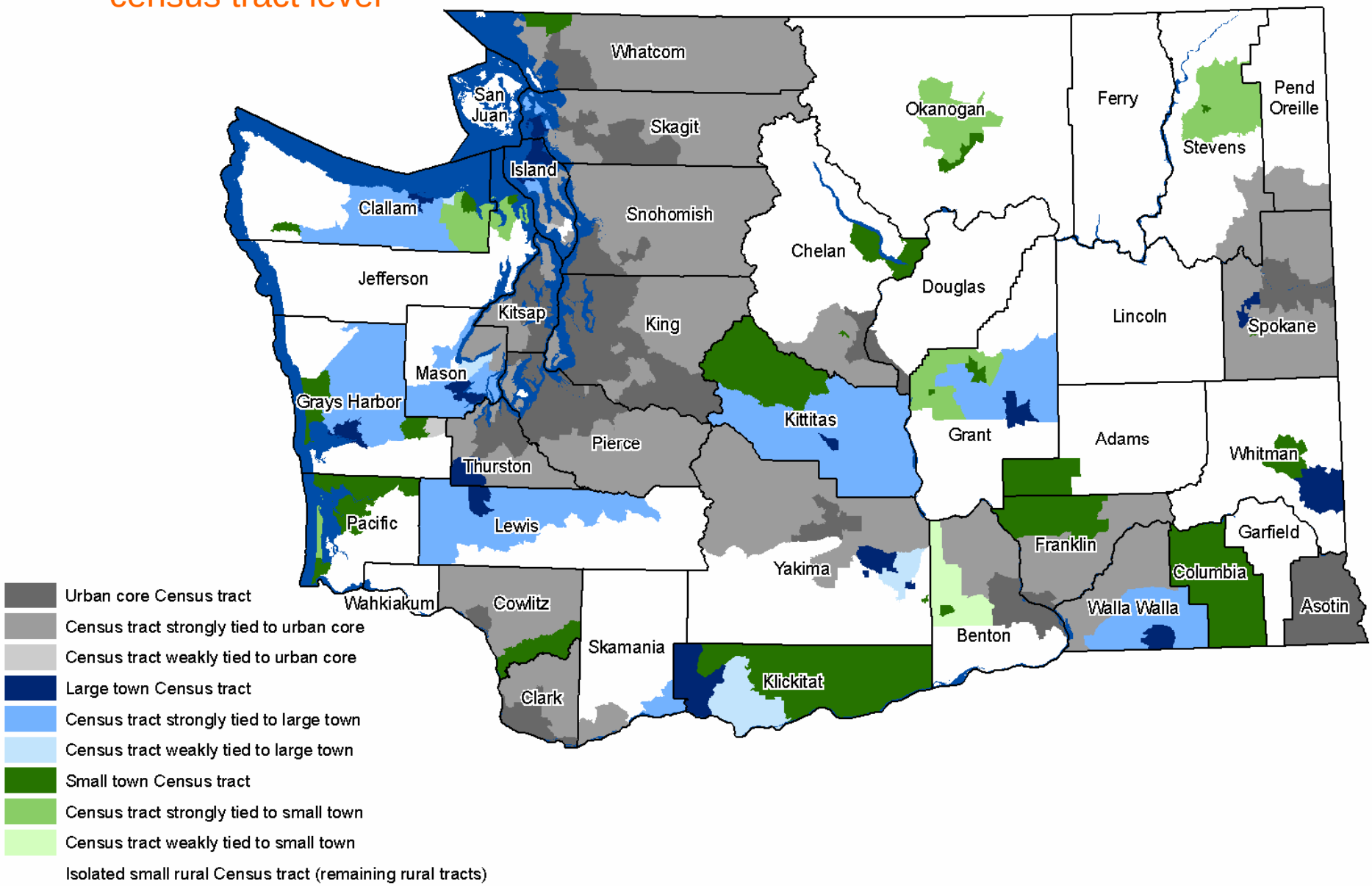
Rural Urban Commuting Areas (RUCA)

- Geographic unit – census tract
  - Mismatch between tract (larger units) and block group (smaller units) geography means tracts on urbanized area and urban cluster boundaries can include urbanized and non-urbanized areas and need to be assigned
- Considers both population density and commuting relationships
- 10 Basic Classifications (30+ sub-classifications)
  - 1: Urban cores (urbanized areas 50,000+)
  - 2 - 3: Urban fringe (not urbanized but > 30% commute to core)
  - 4 – 6: Large town areas (10,000 – 49,999) and commuter sheds
  - 7 – 9: Small town (2,500 to 9,999) and commuter sheds
  - 10: Isolated rural
- Developed in mid to late 1990s by USDA Economic Research Service:
  - Dr. Richard Morrill (UW Geography Department), Dr John Cromartie (US Department of Agriculture), Dr. Gary Hart (UW WWAMI Rural Health Research Center)
- RUCA system updated to 2000 Census Data – Spring 2005
  - Some definitions changed – largely affecting rural classifications
  - See: http://www.ers.usda.gov/briefing/Rurality/RuralUrbanCommutingAreas/
- Zip Code overlay released summer 2005 based on 2004 ZIP Codes
  - See: http://www.fammed.washington.edu/wwamirhrc/

Washington State Department of Health

2000 Washington State Rural Urban Commuting Area Codes

census tract level

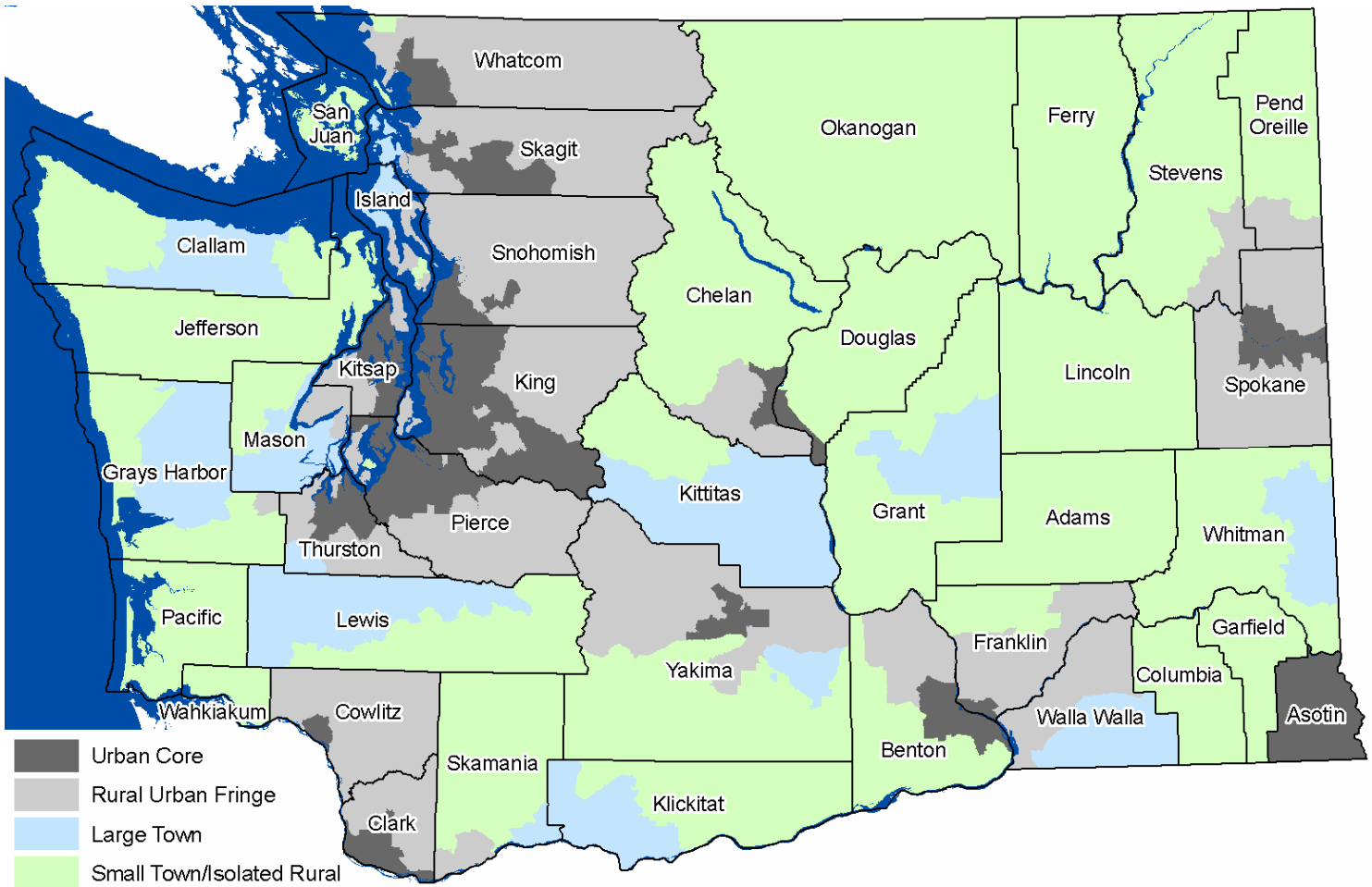


Rural Urban Commuting Area Basics (cont)

- Strengths
  - Flexibility – 10 classes and 30 sub classifications
  - Available by census tract and ZIP Code geography
- Weaknesses
  - Doesn't differentiate urban areas well
  - Updates are infrequent
  - Volatility (smaller areas – boundary changes)
  - Complexity
- Several methods for recombining RUCA codes to reduce complexity and volatility
  - Emphasizing overall rural scale and association
    - Urban (1), Urban-Rural Fringe (2-3), Large town (4-6), small town and isolated rural (7-10)
    - Washington Department of Health four level consolidation is a variation of this with some secondary codes reassigned see:
  - Emphasizing the built environment
    - Urban core (1), large town core (4) and small town core (7)
  - Other examples at http://www.fammed.washington.edu/wwamirhrc/
- Its important to read the small print when making comparisons

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

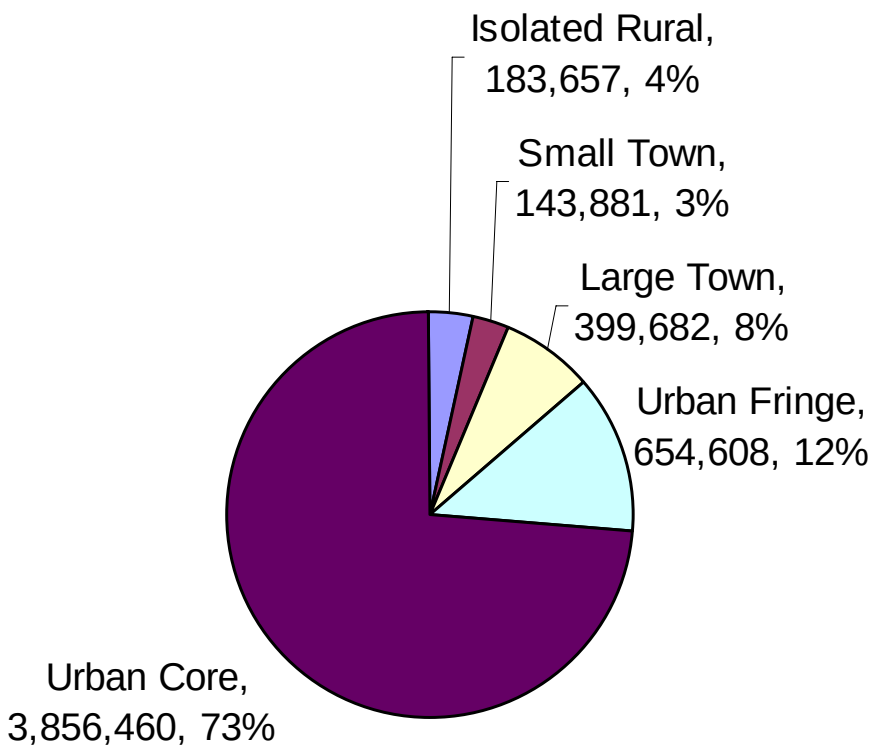
Four level consolidation of 2000 RUCA Codes for 2000 Census Tracts



Washington State Department of Health

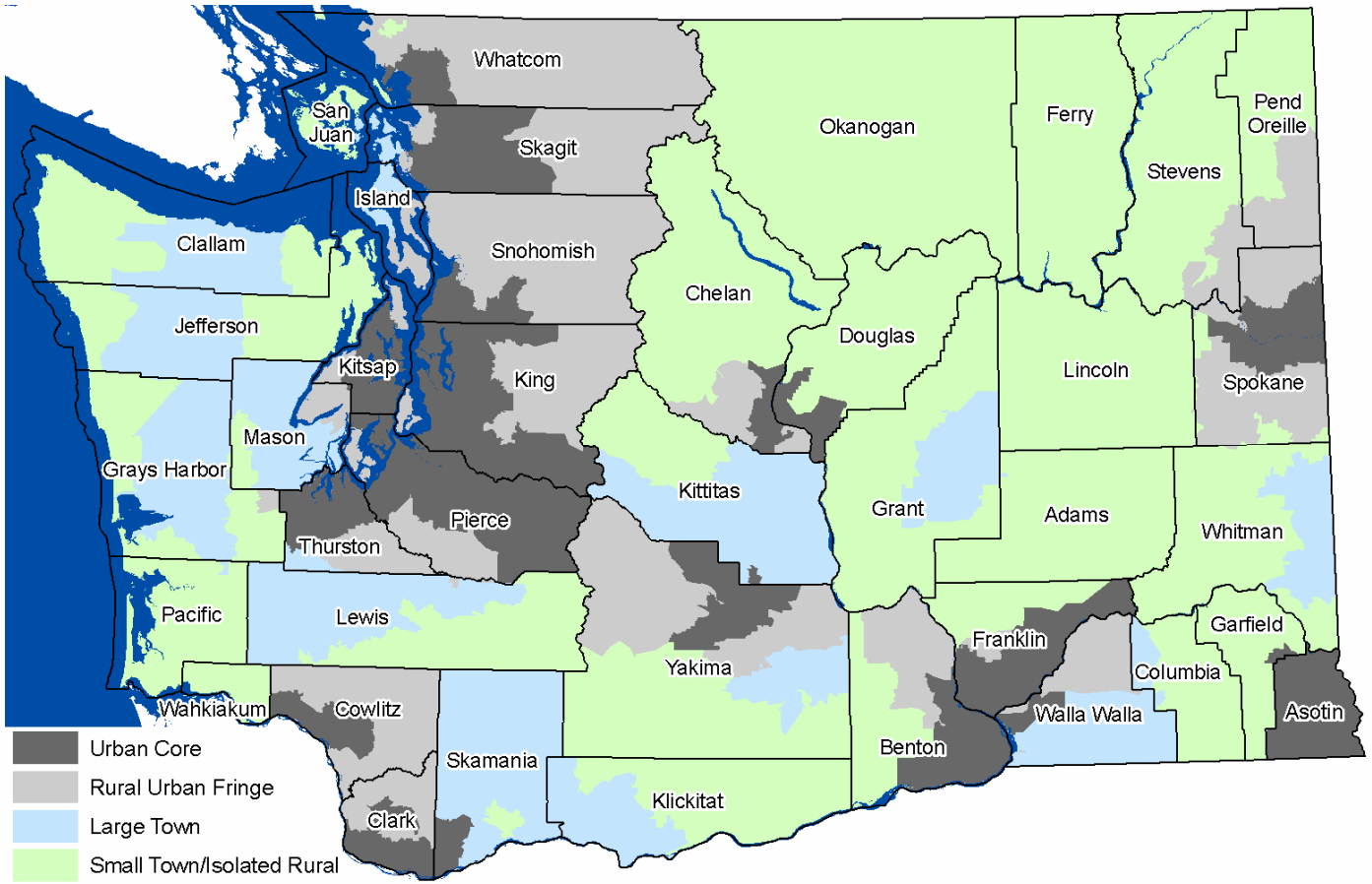
Washington is an urban state

2000 Washington State Population Residing in Census Tract by 2000 RUCA Code, Five Level Aggregation



PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

Four level consolidation of 2000 RUCA Codes for 2004 ZIP Codes



ZIP Code geography is larger (and less precise) than tract geography. But ZIP Code geography is usually more available.

Washington State Department of Health

RUCA Codes for Counties

- Washington State Office of Community and Rural Health developed Dominant RUCA County codes in the fall of 2000 to create a consistent "parallel" method for rural urban comparisons for the Health of Washington State when sub-county data was not available
  - Codes assigned based on aggregating population in census tracts by RUCA codes and assigning a county code based on dominant codes
    - Rough rule of thumb – a county is assigned to major classification if at least 75% of its population is in the major code
  - Urban fringe areas are not isolated
- Three classifications
  - Urban/mixed urban
  - Large town/mixed rural
  - Small town and isolated rural
  - Considering breaking urban into large (urbanized areas >250,000) and small (urbanized areas <250,000)
- Roughly comparable for Metropolitan, Micropolitan, Outside Core Based Statistical Areas
- Not widely used outside Washington State (other county based systems are) – but this could change.

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

Additional Resources

- Best all around source on national developments and alternative methods:
  - USDA – Economic Research Service Measuring Rurality Briefing Room
    - http://www.ers.usda.gov/Briefing/Rurality
- Source for information ZIP-based RUCA codes
  - WWAMI Rural Health Research Center http://www.fammed.washington.edu/wwamirhrc/
- Good overview of history and trade-offs and issues
  - Hart G, Larson, E, and Lishner D, Rural Definitions for Health Policy and Research. American Journal of Public Health (July 2005)
- Washington state summaries (being revised)
  - *Guidelines For Using Rural – Urban Classification Systems for Public Health Assessment* at
    - http://www.doh.wa.gov/Data/guidelines/RuralUrban.htm
  - Washington Rural Health Assessment Project
    - County Definitions of Rural
    - Washington State RUCA codes at Tract and Zip Codes
    - http://www.doh.wa.gov/hsqa/ocrh/WRHAP/WRHAP.htm

Washington State Department of Health

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

Evolving uses of RUCA codes
Washington Department of Health

County based RUCA comparisons for Health of Washington State

	Urban County	Large Town County	Small Town County
Motor vehicle deaths per 100,000 (95% CI)	11.4 (10.8 – 12.0)	20.8 (18.9 – 22.7)	27.7 (23.6 – 32.3)
Age adjusted homicide per 100,000 (95% CI)	4.3 (4.0 – 4.7)	2.7 (2.0 –3.5)	2.6 (1.5 – 4.0)
Domestic violence arrests per 1000	6.8	7.6	7.3
Children in accepted CPS referrals per 1000	37	47	45
Cirrhosis of Liver per 100,000 (95% CI)	9.1 (8.5 – 9.6)	9.5 (8.3 – 10.9)	12.4 (9.9 – 15.4)

ZIP based comparisons – Rural Health Assessment Project

Table 4: Unintentional Injury Deaths per 100,000 Children Ages 1-18 Washington, 1999-2001

	Ages 1–9 years	Ages 10–18 years
Small town rural	22.8	31.3
Large town rural	7.4	19.7
Urban fringe	7.9	14.7
Urban core	5.5	13.5
State	7.2	15.7

Source: Pilkey et al Rural Child and Adolescent Health (2004)

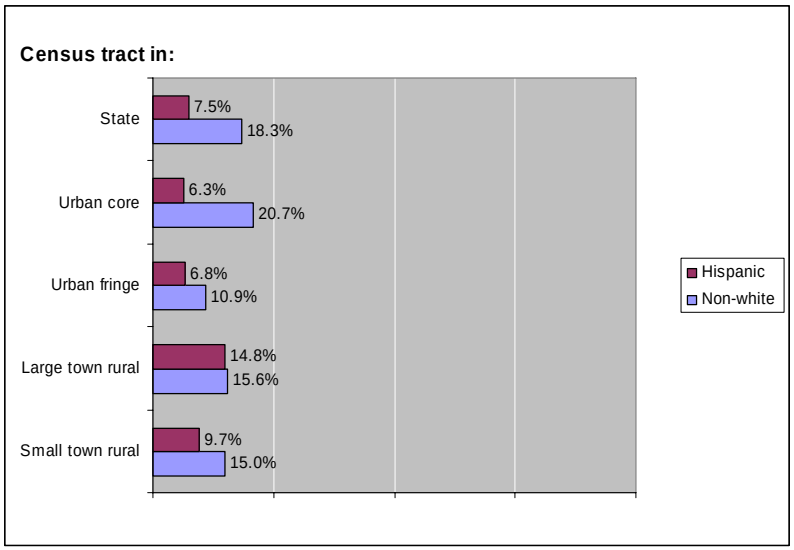
- **2002** Health of Washington State
  - Guidelines first developed
  - RUCA system proposed as “standard”
  - Most comparisons done at county level
- **2003 - 2004** Washington Rural Health Assessment Project
  - Short papers covering rural health trends
  - More refined use of RUCA’s
  - Based on 1990 RUCA Codes “extrapolated” to 2000 Census geography
- **2005 – 2006** RUCA analysis routinely included in Washington Department of Health Assessments
  - Maternal and Child Health,
  - Tobacco, Diabetes,
  - EMS Trauma,
  - Public Health Improvement Process Standards

Washington State Department of Health

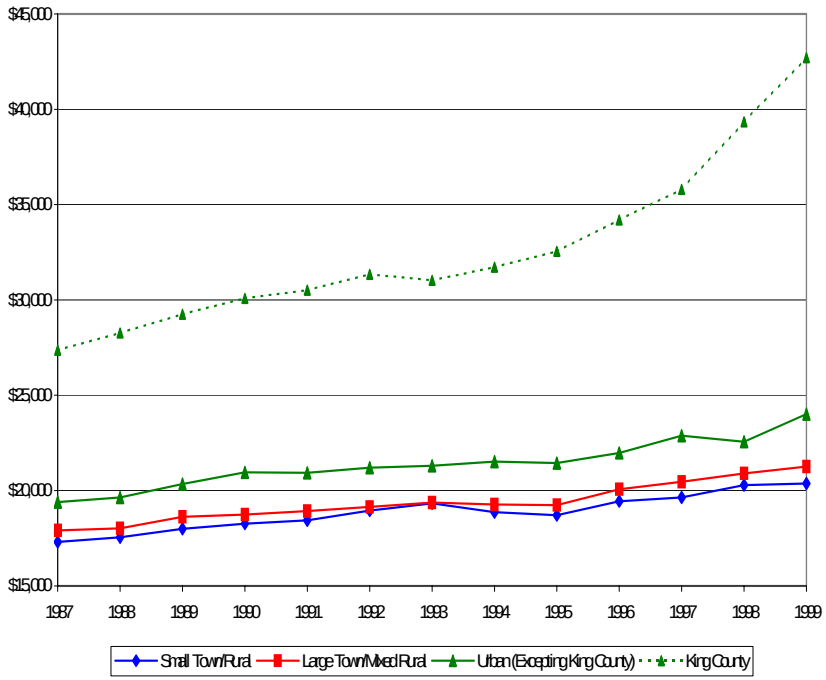
PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

Washington Rural Health Assessment Project
Rural areas – less diverse, poorer and older

Percent Non-White and Hispanic Population, by Rural Classification, 2000



Real per Capita Personal Income, 1987-99 (Constant 1996 Dollars)



		Rural Urban Commuting Area (RUCA) Census Tracts			
Share of Population	**Total State**	**Isolated and Small Rural Areas**	**Large Town Areas**	**Urban–rural Fringe Areas**	**Urban Areas**
45 and older	33.9%	42.5%	35.1%	33.7%	33.0%
65 and older	11.2%	16.5%	13.4%	9.5%	10.8%
85 and older	1.4%	1.9%	1.7%	1.8%	1.4%

Washington Rural Health Assessment Project

http://www.doh.wa.gov/hsqa/ocrh/WRHAP/WRHAP.htm

Washington State Department of Health

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

Lessons learned from Using RUCA codes at DOH

- RUCA system is an improvement over prior methods
  - Sub-county analyses are more precise
  - Language is easier to understand
  - Importance of separation of large and small town areas and urban and urban-rural fringe
- Consolidating codes keeps it simple enough to comprehend
- RUCA system does not differentiate large and small urban areas
- Need for age adjustment and awareness of underlying demographic factors
  - Rural anomalies – college towns
- Rare events and rates
  - How much will you need to aggregate?
  - Confidentiality issues
- Need for supporting data (population denominators)
- Managing geography over time
  - Census tract and ZIP Code boundary changes
  - Urbanized Area and RUCA Definition changes
- Most uses to date are general descriptive uses and a single consistent set of codes is most useful
- More sophisticated uses in the next generation

Washington State Department of Health

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

Design Issues for Selecting Rural Urban Classification Methods

- What is your research question? What are you studying? What is it connected to?
  - Economic or transportation activity (Agricultural injuries – Type of pesticide exposure – Motor Vehicle Death)
  - Economic proximity (access to tertiary care)
  - Population density (water born diseases - lack of access to treated water)
  - Socio economic characteristics
  - Or to determine whether there are differences in prevalence for targeting resources or challenging assumptions/myths
- At what geography is your data available? (County, Census Tract, ZIP or address)
- At what level of rural are you likely to see an effect?
  - Breaking out urban and urban fringe and large and small town is illuminating
  - Sometimes disaggregating rural areas can obscure broader urban – rural differences
- Are there standards in your field? This enables comparisons to other Washington State findings, findings from other states, or national data

Washington State Department of Health

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

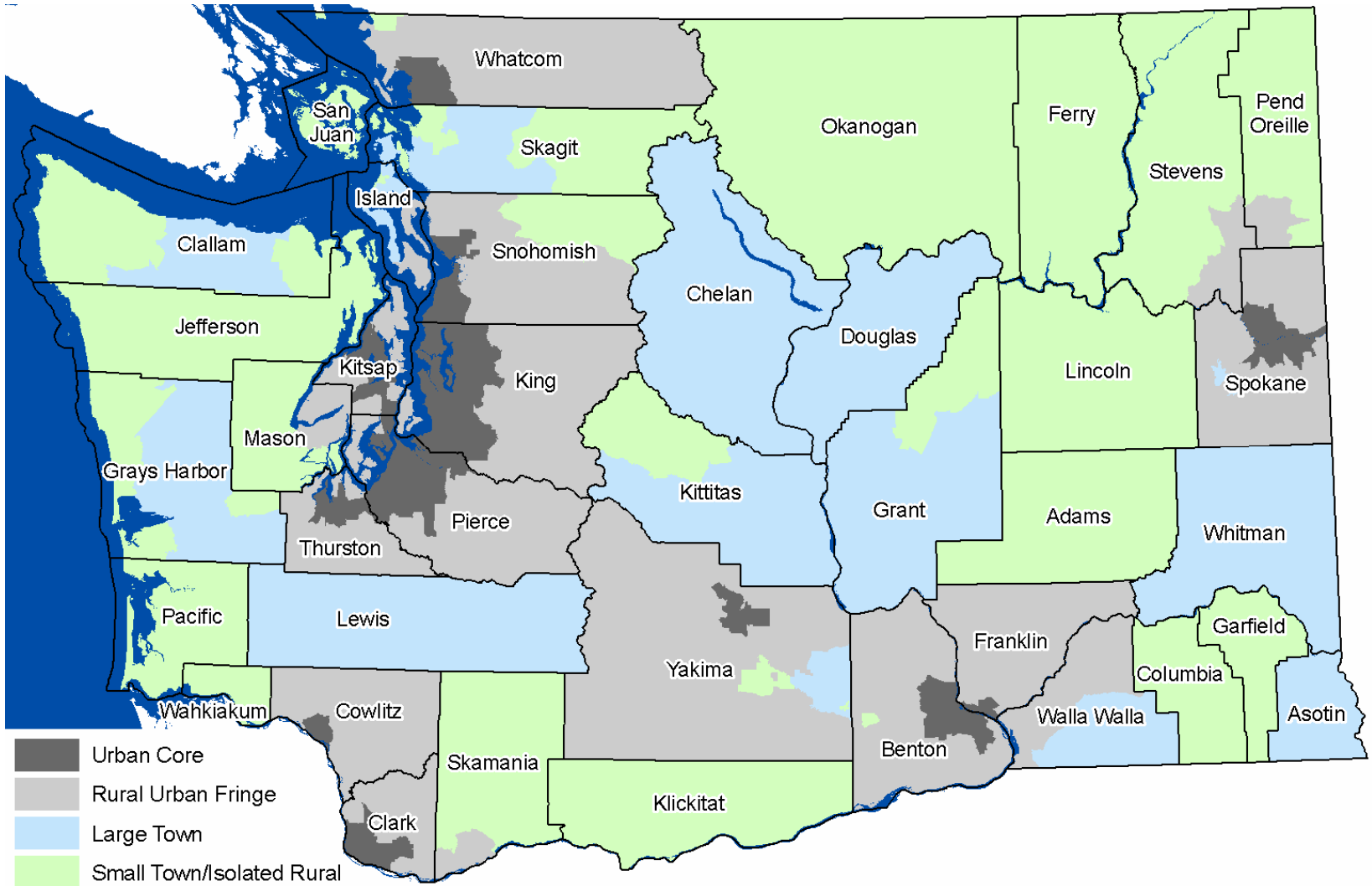
Entering the Jello™ Zone

- How did rural and urban characteristics really change between 1990 and 2000?
- How can we measure rural urban disparities over time?
- Can We Use 1990 and 2000 RUCAs for time series work? If so – for how long?
- Does how we measure or construct our definitions affect what we find?
- What are the sources of change? Which are most important?
  - Population growth and commuting pattern changes
    - Within areas whose RUCA classification did not change
    - Commuting patterns change both ways – towards and away from urbanized areass
    - Urban rural fringe areas are most volatile
  - Boundary changes
    - Census tracts
    - ZIP Codes
  - Methodology changes and issues
    - Definition of urbanized area was revised in the late 1990s
    - Definitions and methodology for assign RUCA Codes changed early 2000
    - Population thresholds –

Washington State Department of Health

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

Dramatic Changes in Washington's Rural Classifications between 1990 and 2000

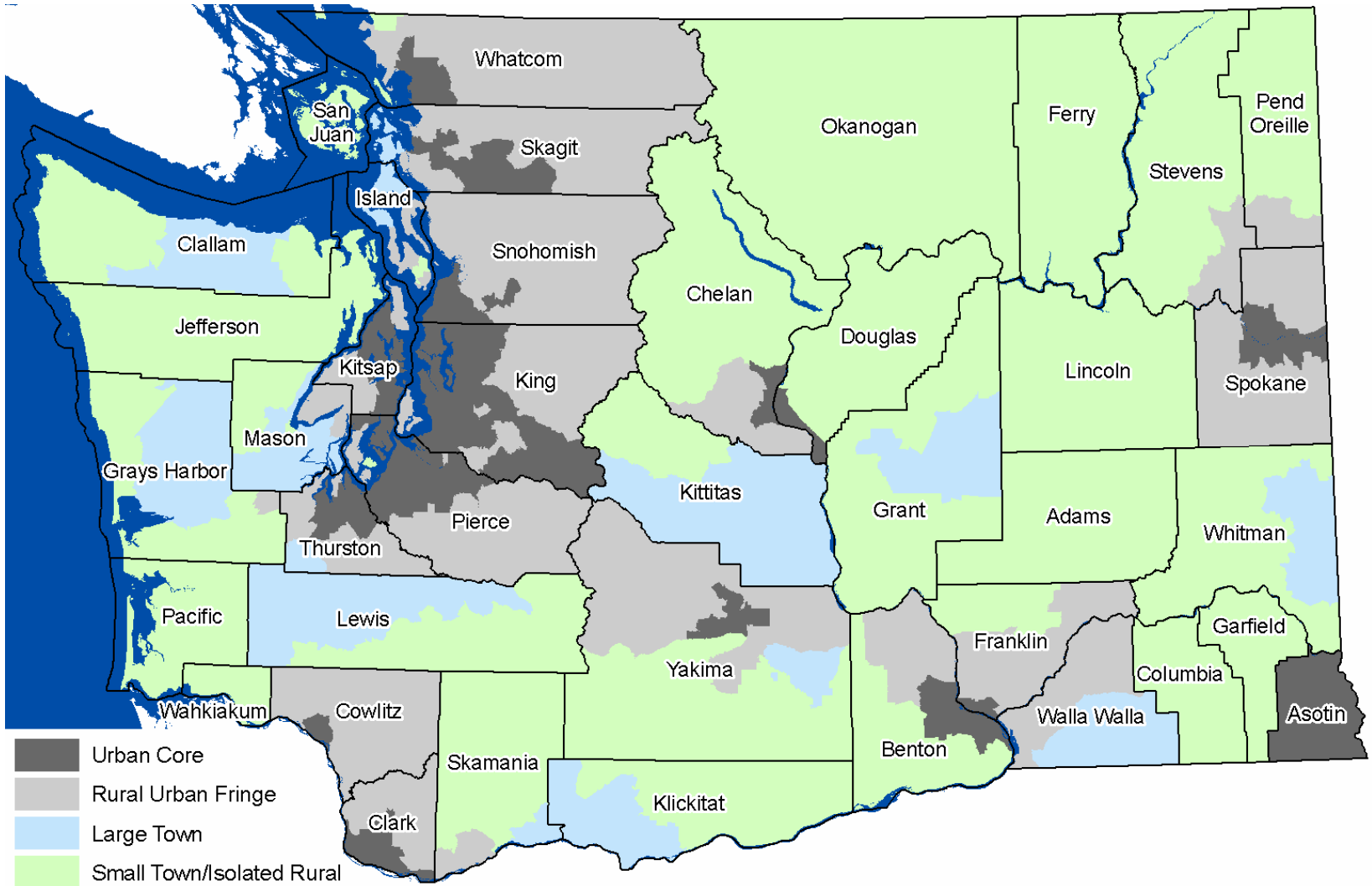


Four level consolidation of 1990 RUCA Codes for 1990 Census Tracts

Washington State Department of Health

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

New urbanized areas (Asotin, Chelan-Douglas, Skagit), new large towns (Mason, Klickitat), areas classified from large town to small town rural (Whitman, Yakima and Lewis)

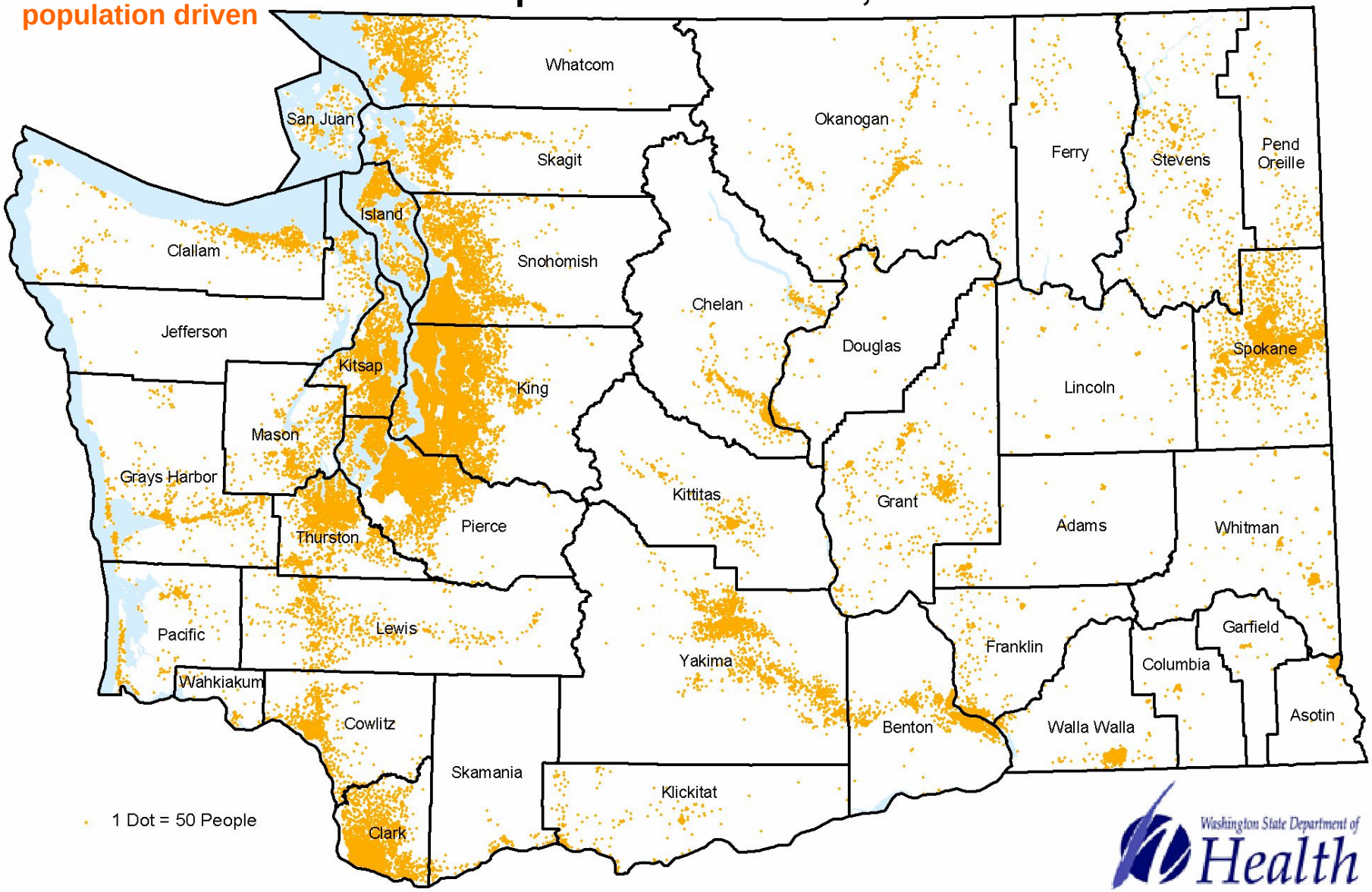


Four level consolidation of 2000 RUCA Codes for 2000 Census Tracts

Washington State Department of Health

Some but not all change population driven

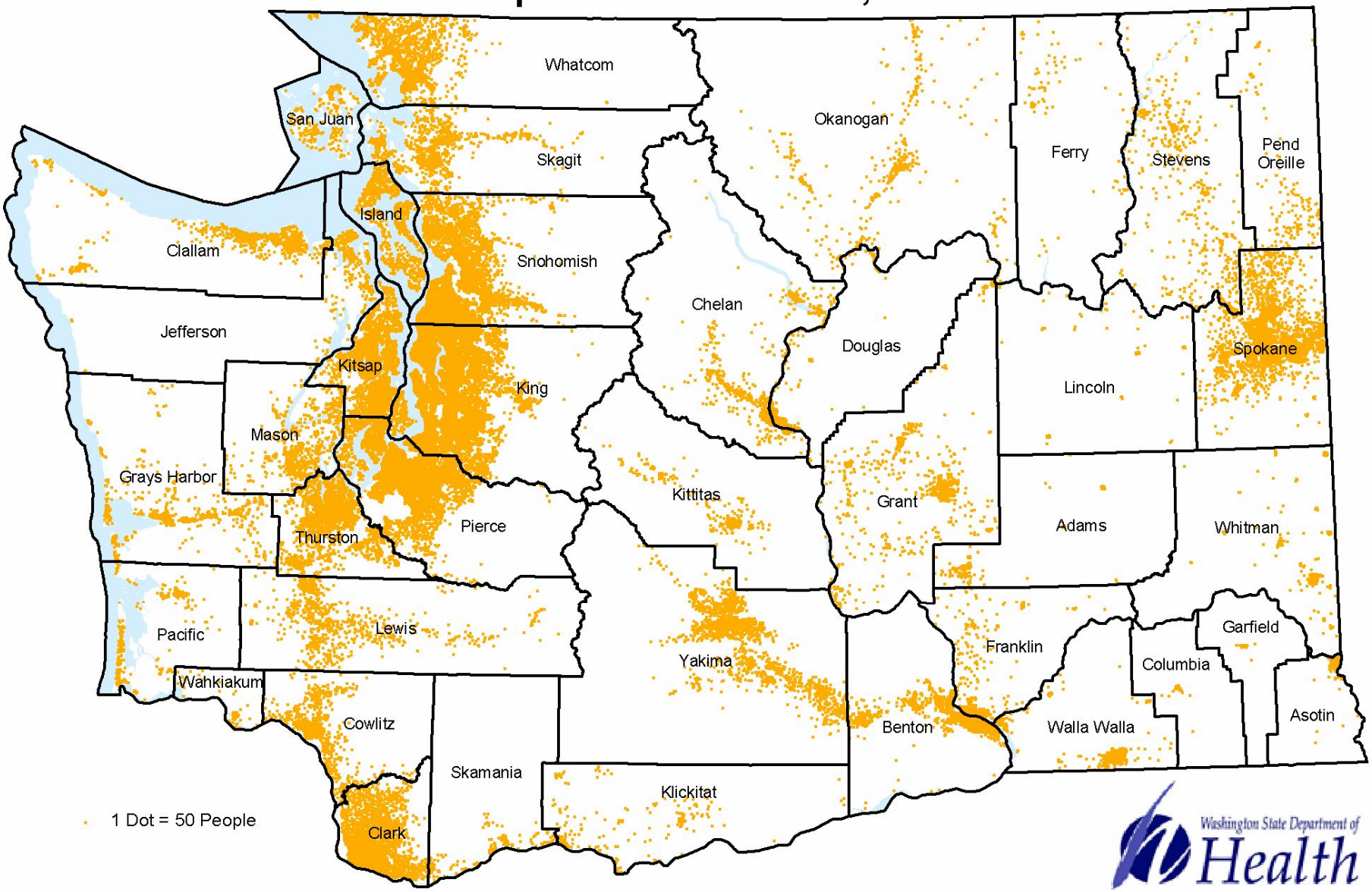
Population Distribution, 1990



Washington State Department of Health

Data Source: US CENSUS Bureau, 1990 block level data

Population Distribution, 2000



Data Source: US CENSUS Bureau, 1990 block level data

Washington State Department of Health

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

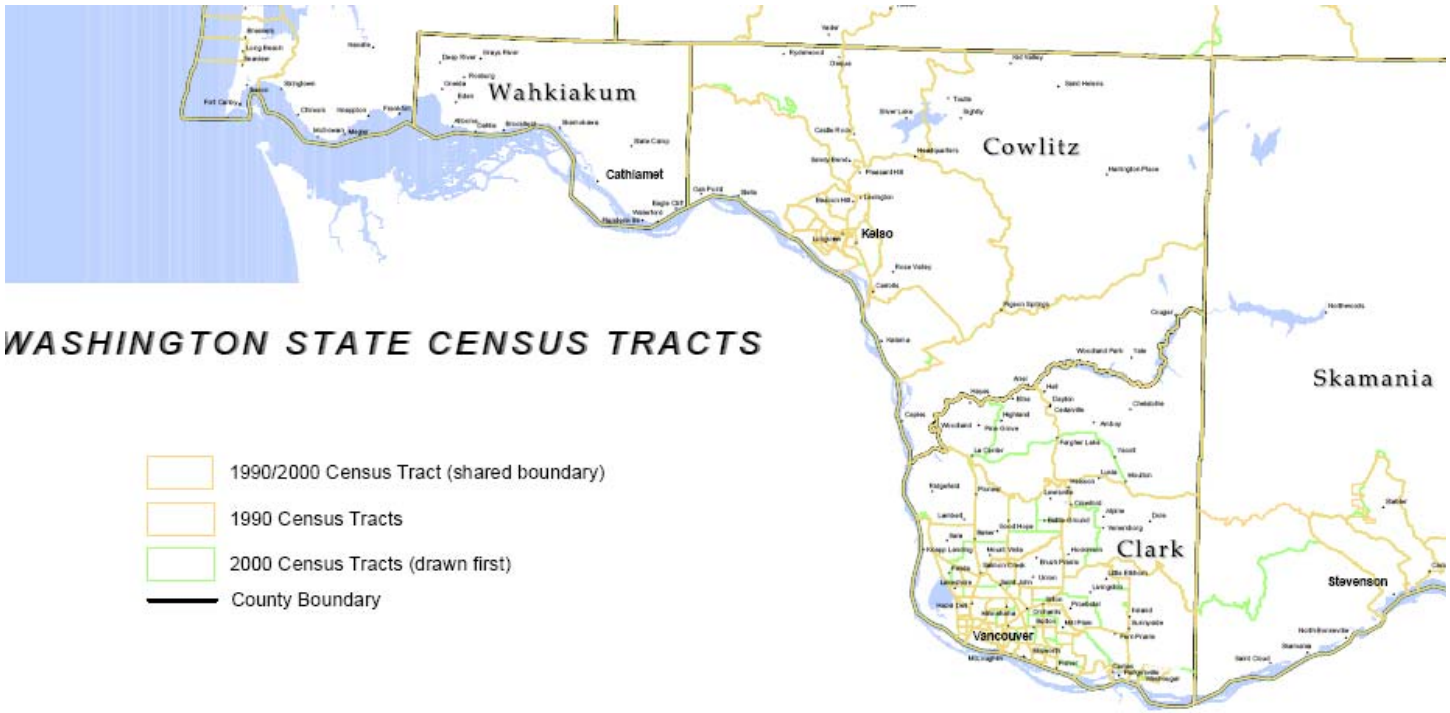
Where did the growth occur?

Classification	1990 – 2000 Population Growth Within 1990 RUCAs (Population Growth)	1990 – 2000 Population Growth 1990 and 2000 RUCAs (Population and reclassification)
Isolated Rural	.1 %	18.6 %
Small Town Rural	3.2 %	.6 %
Large Town Rural	23.9 %	9.9 %
Urban Rural Fringe	44.9 %	15.4 %
Urbanized Area	18.4 %	28.0%
Washington State	25.5 %	25.5 %

- Population in large town and urban fringe areas grew rapidly
  - Resulting in conversion from large town to urban, and urban fringe to urban (and some other interesting movement to be described later)
- Population Tipping and threshold based systems
  - Three new urbanized areas in Washington
    - Going from under to over 50,000 persons in the urbanized area
    - Mt. Vernon – Burlington, Wenatchee – East Wenatchee, Lewiston – Clarkston
  - New large town areas – White Salmon – Hood River, Shelton
    - Going from under (Small town) to over 10,000 (Large town)
  - Just how different is an area whose population increases from 49,000 to 51,000?

Washington State Department of Health

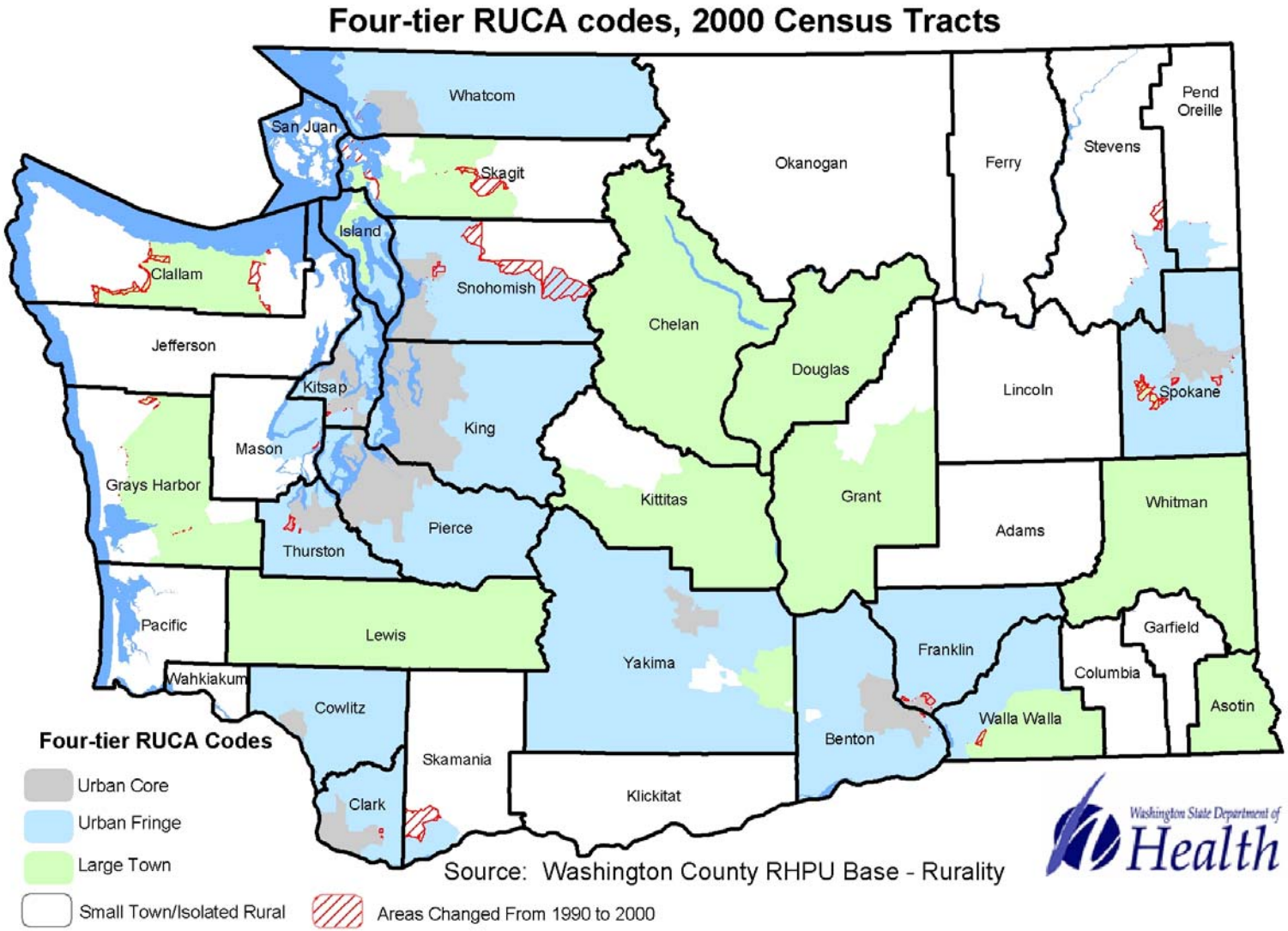
Are census tract stable over time?



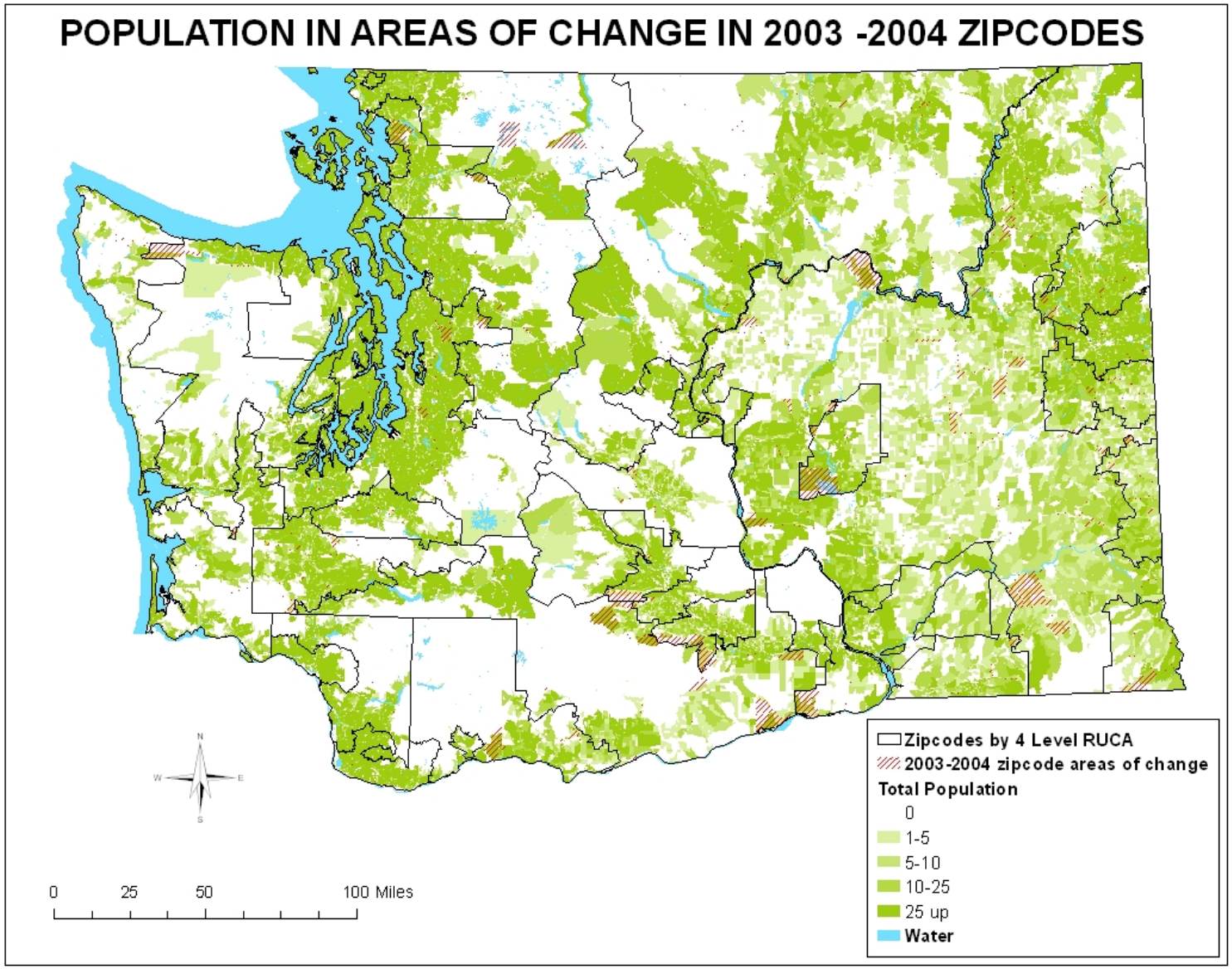
- Census Tract Boundaries changed significantly between 1990 and 2000
- Full Washington state map available at http://ww4.doh.wa.gov/gis/standard_maps.htm
- But do they change how areas are classified under the RUCA system?

Actual impact may be fairly modest (<1% of population) when RUCA codes are consolidated

Red hatched areas changed 4-tier 1990 RUCA code solely because of tract boundary change



ZIP Code boundary changes (Brown hatched areas) do occur. But almost all changes are within consolidated RUCA codes (black lines). This pattern also held when comparing 1998 and 2004 ZIP Codes. This suggests that the affects of ZIP Code boundary changes are fairly minor when using consolidated codes and 2004 ZIP Codes can be used 1998 – 2004



Urbanized Area Methodology

Figure 3

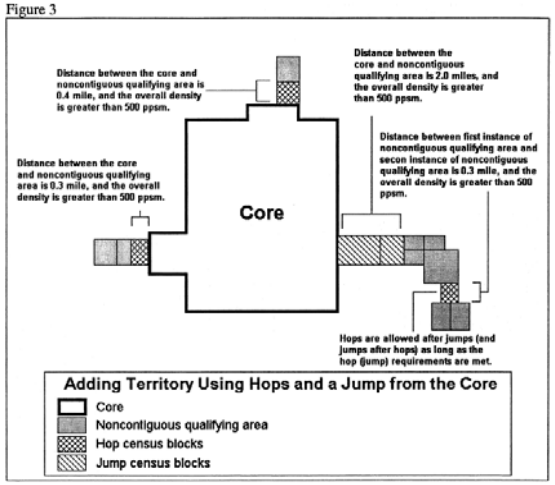


Figure 3 Additional noncontiguous qualifying area may join with the core in the hypothetical example above if the connections that join them meet the hop and jump criteria.

Figure 4

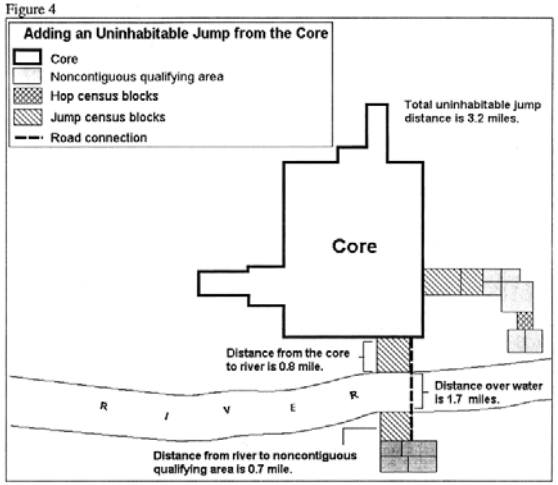
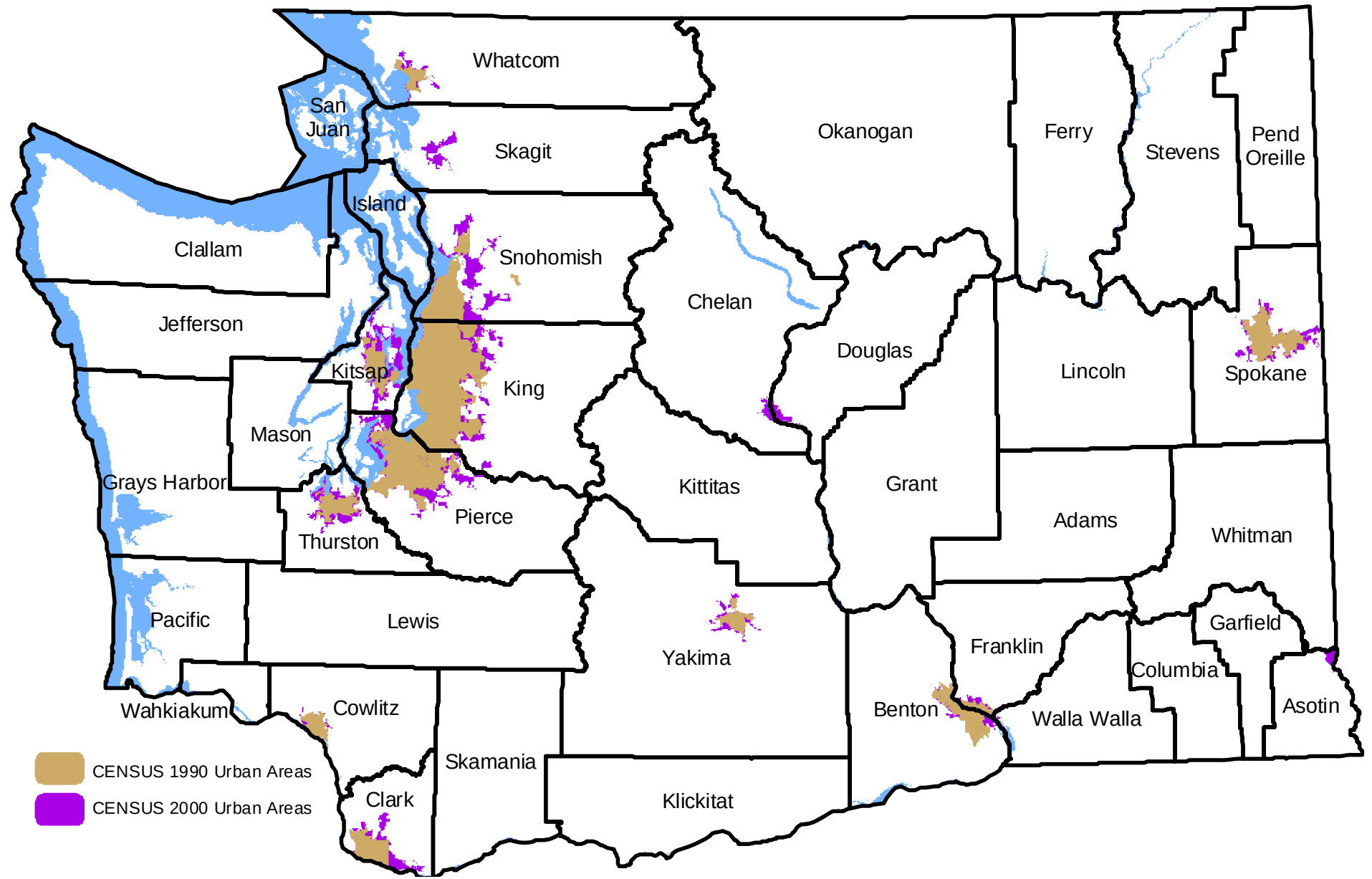


Figure 4 This hypothetical example illustrates an uninhabitable territory connection over water and land areas to connect noncontiguous qualifying area. This example is a 3.2-mile jump, which consists of a 1.7-mile uninhabitable jump over water, and a jump (in two parts) over land that totals 1.5 miles.

- US Census Bureau rules for establishing urbanized areas are complex
- Major revision in 2001
- Rules for including adjacent less densely populated area were liberalized
- This tended to increase the size and population of urbanized areas
  - Spider web effect
- How much isn't known since new methods haven't been back casted to 1990's data


Whatcom
San Juan
Skagit
Okanogan
Ferry
Stevens
Pend Oreille
Island
Clallam
Snohomish
Chelan
Douglas
Lincoln
Spokane
Jefferson
Kitsap
King
Mason
Grays Harbor
Kittitas
Grant
Adams
Whitman
Pierce
Thurston
Pacific
Lewis
Yakima
Franklin
Garfield
Columbia
Asotin
Wahkiakum
Cowlitz
Benton
Walla Walla
Skamania
Clark
Klickitat
CENSUS 1990 Urban Areas
CENSUS 2000 Urban Areas

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

Commuting flow thresholds for classifying outlying census tracts to RUCA Codes also changed

2000 RUCA Assignment Rules

- **8 Small town high commuting: primary flow 30% or more to a small UC**
  - 8.0 No additional code
  - 8.1 Secondary flow 30% to 50% to a UA
  - 8.2 Secondary flow 30% to 50% to a large UC
  - 8.3 Secondary flow 10% to 30% to a UA
  - 8.4 Secondary flow 10% to 30% to a large UC
- **9 Small town low commuting: primary flow 10% to 30% to a small UC**
  - 9.0 No additional code
  - 9.1 Secondary flow 10% to 30% to a UA
  - 9.2 Secondary flow 10% to 30% to a large UC
- **10 Rural areas: primary flow to a tract outside a UA or UC**
  - 10.0 No additional code
  - 10.1 Secondary flow 30% to 50% to a UA
  - 10.2 Secondary flow 30% to 50% to a large U
  - 10.3 Secondary flow 30% to 50% to a small UC
  - 10.4 Secondary flow 10% to 30% to a UA
  - 10.5 Secondary flow 10% to 30% to a large UC
  - 10.6 Secondary flow 10% to 30% to a small UC

1990 RUCA Assignment Rules

- **8. Census tract strongly tied to small town** ***[primary flow to a small Census Bureau defined Urban Place (>30%)]***
  - **8.1** ***secondary flow (30-50%) to urbanized area***
  - **8.2** ***secondary flow (30-50%) to large urban place***
  - **8.3** ***secondary flow (5-30%) to urbanized area***
  - **8.4** ***secondary flow (5-30%) to large urban place***
  - **8.0** ***otherwise***
- **9. Census tract weakly tied to small town** ***[primary flow to a small Census Bureau defined Urban Place (5-30%)]***
  - **9.1** ***secondary flow (5-30%) to urbanized area***
  - **9.2** ***secondary flow (5-30%) to large urban place***
  - **9.0** ***otherwise***
- **10. Isolated small rural Census tract (remaining rural tracts)** ***[no primary flows over 5% to any Census Bureau defined Urbanized Area (metro), large Urban Place, or small Urban Place]***
  - **10.1** ***secondary flow (30-50%) to urbanized area***
  - **10.2** ***secondary flow (30-50%) to large urban place***
  - **10.3** ***secondary flow (30-50%) to small urban place***
  - **10.4** ***secondary flow (5-30%) to urbanized area***
  - **10.5** ***secondary flow (5-30%) to large urban place***
  - **10.0** ***otherwise***

2000 changes necessary (5% too low) – but this change increased area and population with rural classifications

Washington State Department of Health

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

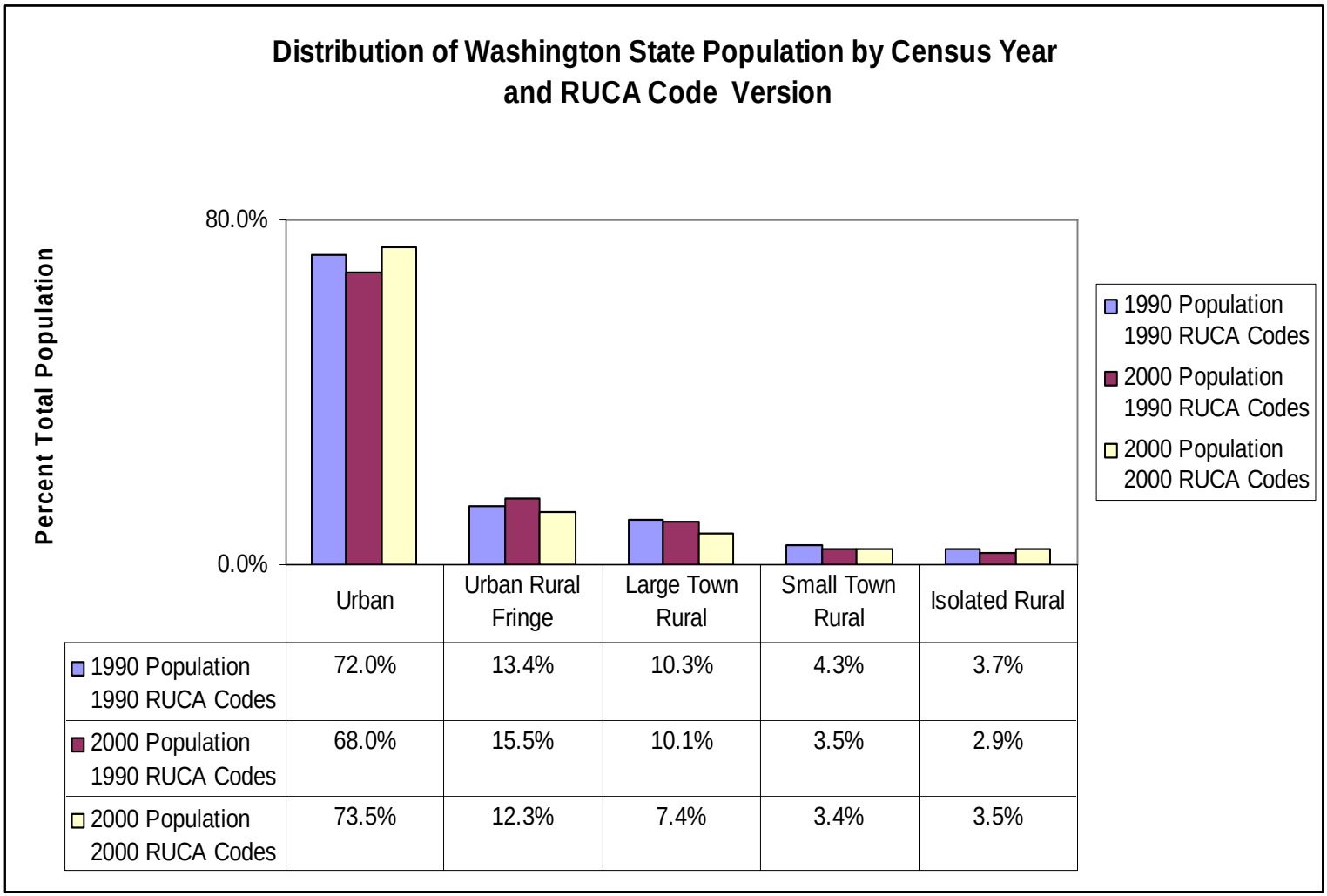
Attempting to disentangle population growth and classification change effects

- A **three way comparison at the census tract level:**
  1. **1990 population classified using 1990 commuting data and 1990 codes**
     - Applied to 1990 census tracts
  2. **2000 population classified using 1990 commuting data and 1990 Codes**
     - 1990 Census tract classifications overlain on 2000 census tract – with some manual recoding (effecting about 1% of population) when 1990 and 2000 census tracts and 1990 RUCA codes did not align
  3. **2000 population classified using 2000 commuting data and 2000 Codes**
- **Difference between 1 + 3 includes both population and reclassification changes**
  - Urbanization trends distorted by classification trends
- **Difference between 1 + 2 is roughly equal to population growth within classification**
  - Provides clues about how change is driven by differential growth rates between major classifications (are urban areas growing faster than rural areas) – but doesn't account for changes in commuting patterns
  - This difference was used in Washington Rural Health Assessment Process monographs on changing rural demography in Washington State in the absence of 2000 RUCA codes
- **Difference between 2+3 is roughly equal to change resulting from re-classification**
  - Provides clues as to how stable classifications are
  - Does not disaggregate change from population growth and commuting patterns, change resulting from modifications to the RUCA system, and underlying changes in methods for establishing urbanized area boundaries.
- Missing link – back-casting to 1990 data using 2000 definitions

Washington State Department of Health

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

RUCA version does make a difference



	Urban	Urban Rural Fringe	Large Town Rural	Small Town Rural	Isolated Rural
1990 Population 1990 RUCA Codes	72.0%	13.4%	10.3%	4.3%	3.7%
2000 Population 1990 RUCA Codes	68.0%	15.5%	10.1%	3.5%	2.9%
2000 Population 2000 RUCA Codes	73.5%	12.3%	7.4%	3.4%	3.5%

Washington State Department of Health

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

Do changes in methods matter?

- **Yes** - small net changes mask a great deal of volatility
  - 82.6 % of Total Population resided in a 2000 tract with same 10 digit RUCA code when 1990 and 2000 classification both applied
  - This increases to 87.8 % when 4 level consolidation used
  - Potential demographic bias not explored
- Volatility in rural classifications higher, larger absolute change in urban areas
- We can't completely isolate methodology driven change from population and commuting behavior driven change
  - But there are strong indications that the changes in methods significanty influenced results
  - Measurement bias may overwhelm any other changes
- **DON'T USE 1990 and 2000 RUCA codes in the same trend analysis until back cast done**

Comparing 2000 Population Classified by 1990 and 2000 RUCA Codes

	% Total Population in Tracts with same 2000 RUCA classification	Persons in tracts changing RUCA status
Isolated Rural	46.8 %	155,800
Small Town Rural	72.9 %	161,768
Large Town Rural	80.1 %	271,658
Urban Fringe	80.0 %	390,606
Urban	90.5 %	498,843

Washington State Department of Health

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

Taking apart the changes

2000 Population Lost (Horizontal)
2000 Population Gained (Vertical)
Example 87,370 persons resided in tracts reclassified from urban (1990) to rural urban fringe (2000)

Influenced by RUCA Rules

1990 RUCA Classification	2000 RUCA Classification					
		Urban	Urban Fringe	Large Town	Small Town	Isolated Rural
	Urban	3,918,768	87,370			
	Urban Fringe	274,768	564,566	29,897	19,135	13,375
	Large Town	111,080	28,191	364,372	9,130	62,829
	Small Town	25,635	22,396	34,399	165,405	17,839
	Isolated		2,664	26,069	33,064	82,834

Influenced by UA rules

Washington State Department of Health

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

Adding more gelatin to the mix

BRFSS* Rural Indicators Project (Currently Underway)

- In-depth analysis of BRFSS (ZIP Code based survey) data using multiple rural classification systems
- Office of Community and Rural Health goal - What can BRFSS tell us about rural urban disparities related to:
  - Access to care, Oral Health, Mental Health, Diabetes and Cardiovascular Disease
- Rural Definitions Analysis
  - Do you get different results when analyzing by county or ZIP Code?
  - What is the impact of changing ZIP Code Boundaries over time? Is it worth it update RUCA ZIPS each year? (**completed**)
  - Do rural disparities persist when adjusted for demographic characteristics?
- Rural Classification Products
  - Updates to Guidelines
  - A single standard, documented default set of ZIP-Based RUCA codes by year (if needed)
  - Standard RUCA ZIP Codes for BRFSS Data Products, VISTA, Health of Washington
  - ZIP Code based population denominators
- Project team
  - Vince Schueler and Beverly Court OCRH Project Manager
  - Katrina Simmons, Center for Health Statistics, BRFSS –
  - Lillian Bensley, Non-Infectious Conditions Epidemiology
  - Nancy West, Environmental Health (GIS – Spatial Analysis)
- Results expected Summer 2006

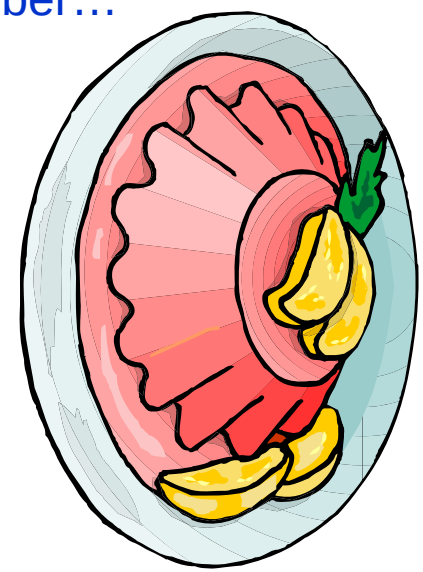
*Behavioral Risk Factor Surveillance Survey

Washington State Department of Health

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

Conclusions

- The RUCA system is state of the art
  - It is flexible and much better suited to Washington State geography
- Several recent changes to the RUCA system and underlying methods (urbanized area methodology) have improved the power and utility of this tool
- But the effects of methodological changes may overwhelm rural urban differences when making comparisons across the methods (1990 and 2000)
  - Washington's demography and geography magnify effects of methodological change
  - The relative effects of these changes are greater in rural areas
- Rural is a concept and a malleable one at that
- Using rural urban classification systems is a bit like nailing Jello™ to the wall BUT remember…



Washington State Department of Health

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

Concepts for nailing Jello™ to the wall

- Don’t add too much water
  - Don’t dilute results with measurement error. Comparisons longer than 2000 +/-5 years that use 1990 and 2000 methods are not advised until new methodology is back-casted to1990 data
  - Consolidating RUCA codes to a smaller set (4-5 codes) reduces classification volatility
  - Consider using county based classification schemes
- Freeze the Jello™
  - Think in terms of “freeze frame” analysis – areas classified as rural in 2000
  - Rural – Urban disparity trend analyses over 3-4 years should be made with care
  - Rural urban comparisons work better as point in time analyses until more bridging work is done
- And finally remember just because you can’t easily nail Jello™ to the wall.. doesn’t mean it isn’t good to eat

Washington State Department of Health

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

Contact Information

Vince Schueler

Office of Community and Rural Health

(360) 236-2806 (Voice)

(360) 664-9273 (Fax)

vince.schueler@doh.wa.gov

Washington State Department of Health

PUBLIC HEALTH
ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON

Summary of Guidelines For Using Rural and Urban Classification Systems for Public Health Assessment

- Match rural classification scheme to the problem
  - There is no right answer
- If data are available at the census tract or ZIP code level, use the RUCA system
  - County-based methods tend to obscure differences
  - Census tract RUCAs are more precise than ZIP Code based RUCAs
- For routine sub-county analyses collapse the ten RUCA codes into four categories
  - Urban Core Areas
  - Urban Rural Fringe Areas
  - Large Town Areas
  - Small Town and Isolated Rural Areas
- For routine county analyses use OCRH Dominant RUCA Codes in three categories
  - Urban (may want to break out large and small urban)
  - Large town/mixed
  - Small town and isolated rural counties
- Rural-urban differences may reflect underlying differences in demography
  - Age, race, and ethnicity
  - Income and formal education
- Time series analysis – use at your own risk
- Document potential for misclassification in technical notes
- **Clearly identify your choice of classification systems in all analyses**
- Guidelines available at:
  - http://www.doh.wa.gov/Data/guidelines/RuralUrban.htm

Washington State Department of Health

PUBLIC HEALTH

ALWAYS WORKING FOR A SAFER AND HEALTHIER WASHINGTON